Interstate Banking and Competition: Evidence from the Behavior of Stock Returns

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In this paper, we empirically examine the response of bank holding company stock returns over the period 1964 to 1989 to changes interstate banking laws. We find that returns respond negatively and significantly to an increase in the number of eligible source states from which acquiring banking firms can enter the bank holding company's headquarters state. In addition, the negative effects are stronger in the absence of reciprocity requirements and weaker in the presence of a market that already is relatively competitive. We conclude that interstate banking tends to enhance potential and/or actual competition in state banking markets, particularly those formerly restricted.

Since the late 1970s, many states have enacted interstate banking legislation. These laws permit bank holding companies headquartered in selected other states to operate bank subsidiaries in their state. Recently, bills have been introduced in Congress to liberalize interstate banking laws to permit banks to operate their own branches across state lines.[1]

Proponents of such legislation argue that complete elimination of interstate banking restrictions would generate some significant benefits, including a more efficiently configured banking industry, and would invigorate competition in the commercial banking market. Opponents are concerned that interstate branching would lead to excessive concentration and ultimately to a less competitive banking market.

In this paper, we examine the effect of liberalization of interstate banking by studying individual bank stock returns over the period 1964 to 1989. The patchwork liberalization of interstate banking laws over this period had the effect of varying the number of states from which bank holding companies could enter various state markets. We find that individual bank stock returns reacted negatively to these legislative changes, consistent with the hypothesis that interstate banking increases potential and/or actual competition. For banks in general, this negative effect on returns appears to be stronger than any positive effects that would stem from potential economies of scale or scope or from the benefits of asset diversification.

The remainder of the paper is divided into five sections. In Section I, we discuss the legal background of interstate banking laws. In Section II, the theory regarding the potential effects of interstate banking is presented and we present the findings of previous researchers. Section III discusses the methodological approach that we employ, and the data used. We present the empirical findings in Section IV, followed by a discussion of policy implications in Section V.

I. The Legal Background of Interstate Banking

Interstate banking restrictions originate in laws passed earlier this century. The McFadden Act, originally passed in 1927 and amended in 1933, effectively prohibited interstate branching by giving the states, not the federal government, the power to decide whether any bank could establish branch offices within their borders. The McFadden Act has been interpreted to say that if state law is silent on the issue of interstate branching, then out-of-state banks are prohibited from establishing branches in-state.

The McFadden Act left open the possibility of a bank holding company having separately chartered bank subsidiaries in more than one state. This mechanism of interstate banking was foreclosed, however, by the Douglas Amendment to the 1956 Bank Holding Company Act. The Douglas Amendment prohibited bank holding companies from acquiring or establishing banks outside their home office state unless the laws of the state in which the bank was to be acquired or established explicitly provided for such entry. In effect, therefore, state law presently determines the extent of interstate banking.

Recent Liberalization

Beginning in the late 1970s, states have passed interstate banking laws that explicitly provide for the entry of out-of-state bank holding companies.[2] The mechanisms permitted by these changes in law involve outside ownership of in-state bank subsidiaries. It is important to note that these laws do not permit out-of-state banks to set up or acquire in-state branches. There are three main distinctions to be made among interstate banking laws. The first

Chart 1
Effective Dates for Interstate Banking Laws

■ No Law   ▩ Regional Reciprocal
▩ National Reciprocal   ■ National Nonreciprocal
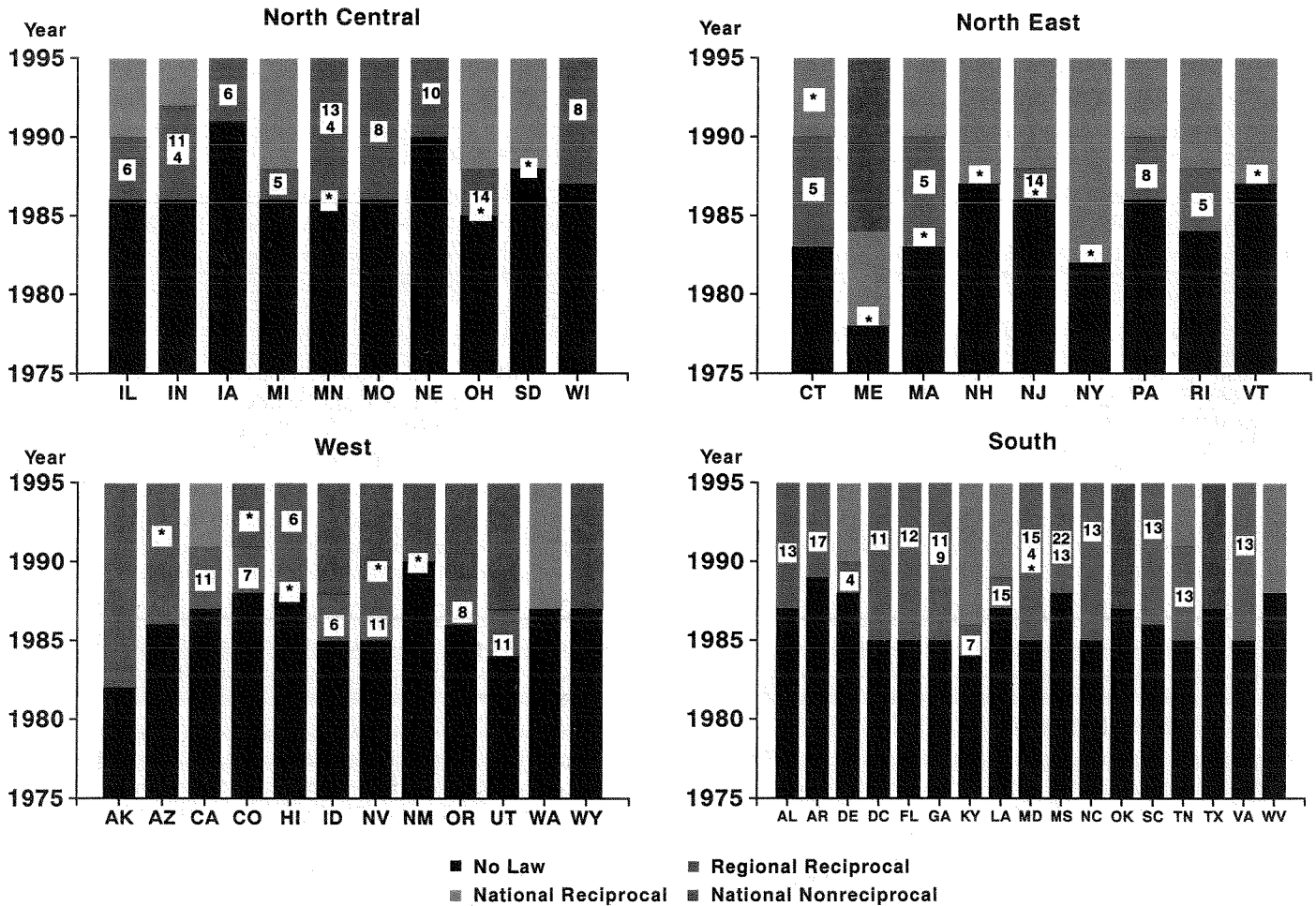
*Law Implemented Allowing De Novo Entry
Numbers represent the number of eligible source states for regional reciprocal laws.
(GA, IN, MD, MN, and MS changed their laws to increase the number of eligible states.)

pertains to the geographic extent of the zone from which out-of-state bank holding companies may enter. Under "regional compacts," entry is permitted only from states in a surrounding region, with the boundaries of the region determined by the state passing the law. On the other hand, national interstate banking laws designate the entire country as the eligible region.

The second distinction pertains to whether the interstate banking law requires "reciprocity." All of the existing regional compacts and some of the national laws limit entry to those states in the eligible region that permit bank holding companies from the "host" state to enter *their* state.[3]

The third distinction pertains to the permissible means of entry. Some states permit entry via establishment of a new (*de novo*) bank subsidiary, while others require that entry be via acquisition or merger with an existing institution. It appears that all states that permit *de novo* entry also permit entry via acquisition.[4]

Many states have changed their original interstate banking laws. The effective dates for the different types of interstate banking laws for each state are shown in Chart 1.[5] In Chart 1, interstate banking laws are presented by

region. Because many of the laws are regional reciprocal laws, this makes it easier to estimate the number of *actual* eligible source states as opposed to potential source states. As seen in Chart 1, changes have all been in the direction of liberalizing the restrictions on entry. For example, a state may move from a regional reciprocal law to a national reciprocal or national nonreciprocal law, or from a national reciprocal law to a national nonreciprocal law.

Chart 1 also shows the number of eligible "source states."[6] As seen in Chart 1, some states have enlarged considerably the number of potential source states in their regional compact over time.

Currently only Utah, Nevada, Rhode Island and Virginia permit interstate branching.[7] As stated in the introduction, though, legislation has been introduced in both the House and the Senate to repeal the McFadden Act, which would allow U.S. banks to branch nationwide irrespective of state law. The effect of such legislation, should it be adopted, is an open question. One purpose of this paper is to examine the experience of states with various types of interstate banking laws in order to infer the effects of interstate branching.

II. Theory and Previous Research

Because the empirical research in this paper concentrates on an examination of bank holding company stock returns, which depend on profitability, our discussion centers around the effect of interstate banking on bank profits. However, underlying the profitability effects are effects on bank costs and competition and accompanying effects on the consumer of bank services. By examining bank profitability, we hope to infer the relative importance of these potential cost and competition effects.

Theory suggests that interstate banking may either raise or lower bank profits. For example, interstate banking may raise profits by lowering costs, either through scale or scope effects or through diversification effects. First, to the extent that interstate banking restrictions are binding, banks may be forced to operate at a suboptimal scale or to offer a suboptimally limited range of services. Relaxation of the restrictions, therefore, might permit banking organizations to operate at a more efficient scale and with a more efficient scope. As a result, banks would have lower operating costs and, in the short run at least, higher profits. In the long run, though, we could expect at least some of these profit gains to be competed away, as consumers face more favorable prices.

A second effect of interstate banking on costs may arise from the diversification of bank portfolios. To the extent that bank portfolio risk is nonsystematic and that returns on

any new assets are not perfectly positively correlated with the return on the existing portfolio, the expansion of business opportunities introduces the possibility of reducing risk by diversifying. If bankruptcy costs are at least partially borne by the bank, and if diversification is costless, then diversification raises expected profits and may eventually benefit consumers, too.[8]

Geographic diversification may not be without costs, however. The management of loan assets requires administrative input, monitoring of the borrower, and implementation of covenants and terms. Depending upon the costliness of these activities, the pure diversification advantages could be offset by the costs of administering and monitoring such varied and far-flung loans. Thus, like the scale economy effects, the effective impact of diversification advantages of interstate banking is ultimately an empirical issue.

Interstate banking may affect profitability through its effect on costs, as just discussed, or through its effect on competition. Theoretically, interstate banking could either strengthen competition, and lower profits, or weaken competition, and raise profits. On the one hand, interstate banking could lower profits by increasing the threat of competitive entry in regional banking markets. For example, incumbent banks may enjoy above normal profits if they can set "limit" prices that are above the competitive

level but low enough to deter entry. Entry will be deterred if there are significant learning economies, set-up costs, or other barriers that make entry into the region at or below the limit price unprofitable.[9]

By permitting entry from a larger pool of existing bank holding companies, the relaxation of interstate banking restrictions increases the probability that one of the pool will have low enough costs or a large enough store of wealth to enable the bank to enter and undercut the incumbents. Anticipating this, incumbents may lower limit prices in response to interstate banking liberalization, and thus experience lower profits. If they do not, the market may expect that actual entry will increase. Either way, the expected value of future profits will decline, to the benefit of consumers.

On the other hand, the mergers and acquisitions facilitated by interstate banking or branching could lead to a reduction in the number of banks in the nation and, thereby, decreased competitiveness and increased profitability. While this effect is possible, it relies on the assumption that the relevant geographic market is the nation as a whole. It seems likely, however, that the relevant market, for consumer or retail banking services, at least, is smaller than the nation.[10] Thus, even if interstate provisions decrease the number of banking firms in the whole country, they do not necessarily decrease (and may increase) the number of banking firms in competition for a region's consumers. Some banking products, of course, likely have effective markets larger than a region; business lending, for example, is probably not locally confined. For such services, it is possible that interstate banking would not increase competition, although foreign competition likely provides a safety valve against undue concentration of power.

We have discussed several hypotheses regarding the effects of interstate banking, but there are only two possible effects, if any, on profits—they will either go up or down. In our empirical work, we will study the effect of interstate banking on bank profitability and returns. If we observe that profits go up, it may be because interstate banking decreases costs, or decreases competition, or both. In this case, the effect on consumers would be ambiguous. However, if profits fall, this will suggest an increase in potential or actual competition, which would unambiguously benefit consumers.

A number of previous studies have attempted to evaluate the effects of interstate banking. In general, this prior research has focused on the portfolio or stock price performance of banks involved in mergers or acquisitions, or the comparative performance of interstate and noninter-state banking firms. We will now review some of this past work.

Cost Effects: Economies of Scale and Scope

Born, Eisenbeis, and Harris (1988) examined bank acquisition announcements. Using a standard market model of stock returns, these authors looked at whether the announcement of an agreement to acquire an out-of-state bank causes "abnormal returns" for the acquiring bank holding company.[11] They find no effect, and state that this suggests either that there are no benefits to interstate banking, or that the benefits are distributed to the shareholders of the acquired firm, as is the case in general, industrial mergers.[12]

Goldberg and Hanweck (1988) look directly for economies-of-scope advantages in interstate banking. These authors found that grandfathered interstate banking firms did not enjoy any long-run competitive advantage, in terms of market share or profitability, over similar sized non-interstate banking firms. Goldberg and Hanweck conclude that interstate banking firms, although they have the opportunity to engage in a wider range of activities, are not in general more efficient than comparable noninterstate banking firms.[13]

This finding is consistent with the conclusions of numerous, more general studies that have found that economies related to scale or scope are relatively small. For example, Berger and Humphrey (1990) used actual average costs for all insured commercial banks in 1984 to estimate the contribution of various factors to differences in average costs. They estimated differences of 25 percent or more in average costs between the highest and lowest cost groups of banks due to inefficient management, and differences of only 5 percent or less due to scale or product mix.

Cost Effects: Diversification

Other studies have examined the effect of diversification on bank performance. Liang and Rhoades (1988), for example, investigated whether increases in the geographic dispersion of bank offices decrease the probability of bank insolvency. Specifically, they examined whether the portfolio effects of asset diversification were outweighed by the effects of an increase in administrative and monitoring costs for the new assets. Liang and Rhoades' empirical results supported the conclusion that geographic dispersion does reduce the probability of bank insolvency.[14] Should insolvency costs be partly borne by banks, this, in turn, would imply that banks diversified interstate would enjoy cost advantages over nondiversified banks. Liang

and Rhoades also report, however, that geographic diversification was costly to administer; while reducing earnings variance, it also reduced average earnings. On net, though, diversification was not found to decrease the market value of the banking firm.

Evidence pertaining to the relationship between the geographic dispersion of bank offices and *actual* bank failures can be found in the work of Hilary Smith (1987). Using data from actual bank closures, Smith finds empirical evidence that intrastate branching restrictions, which limit branching to a confined area, increase the incidence of bank closure. One may reasonably extrapolate from this result to say that interstate banking has the potential to decrease the probability of bank closure.

Effects on Competition

In addition to effects due to economies of scale or scope, or geographic portfolio diversification, interstate banking may have an effect on the level of actual or potential competition. Adkisson and Fraser (1990) examined the effect of interstate banking laws on premiums paid in actual bank mergers, whether or not the merger was across state lines.[15] They hypothesized that interstate banking could have two countervailing effects on bank merger premiums in general. First, they say, interstate banking may increase competition, thereby lowering the market value of previously protected banking firms and lowering merger premiums. Second, they maintain, interstate banking may increase the number of potential bidders for a particular firm, thereby increasing merger premiums.

Adkisson and Fraser find that the second effect dominated the first effect; that is, bank merger premiums were larger in states that permit interstate banking. This does not mean that competitive effects are absent, of course, but only that they may be overpowered by the effects of rivalry among potential bidders for the (self-selected) sample of banks acquired. By focusing on actual mergers, therefore, the Adkisson and Fraser study cannot answer the broader question of what happens to overall levels of competition in bank product markets.

In summary, the available studies suggest that there are at best modest economies of scale and scope effects, but that the diversification effects of interstate banking may be significant.[16] However, it remains an open question whether interstate banking significantly enhances competition. To address this question, it is necessary to study the effects of interstate banking on all banks, not just those selectively involved in merger and acquisition activity.

III. Methodology and Data

The methodology employed in this paper is designed to determine whether relaxation of interstate banking restrictions enhances competition in commercial banking, or, alternatively, degrades competition and/or enhances efficiency. As explained above, these two alternatives would be expected to have opposite effects on bank profitability. Conceptually, we could make this determination by examining bank performance at a portfolio level before and after changes in interstate banking legislation. The prices of bank products and the level of bank profits could be examined for evidence of effects on costs and competition.

Unfortunately, the quality of price and portfolio information on commercial banks is not sufficient to support such a study. Bank product prices are difficult to obtain, and are not easily separated from changes in other, qualitative dimensions of bank products. Similarly, bank balance sheet and income statement data offer only imprecise measures of actual costs, net worth, and earnings because of the use of book value accounting practices in banking. Those data need to be studied in detail each quarter bank by bank, as is done by private bank stock analysts, to derive more accurate estimates of actual bank performance.

Consequently, we have chosen to study the effect of interstate banking on costs and competition by using data on bank stock price behavior. We would expect changes in profits to be capitalized in share prices and thereby show up as changes in returns. This approach implicitly relies upon the analytical assessments of the marketplace, which likely incorporate a greater information set than that available to the researcher. To the extent that stock markets efficiently incorporate this information, therefore, this approach offers greater potential precision than the direct study of prices or portfolio data.

There are important drawbacks to this approach, however. First, the stock price methodology confines our study to the set of banks with traded equity. At present, useful stock price data are available for fewer than 200 banking organizations. These organizations account for over 85 percent of total banking assets or deposits and, hence, the effects on these banks likely are the dominant effects in the banking marketplace generally. However, the self-selected nature of our sample implies that the results of our study are not easily generalized to the over 14,000 smaller institutions we were unable to study, and may be biased by large bank-specific effects.[17] Additionally, the relatively thin sample of banks limits the degree of detail on the regional banking environment that can be em-

ployed, because some smaller regions are not represented by traded banks.

The basic analytical method thus relates individual bank stock returns over time to variables representing the legal environment and general stock market conditions. The following basic system of equations describes the statistical analysis in this paper:

$$(1) \qquad R_{it} = a + bD_{it} + cM_t + e_{it}$$

where

R_{it} = the dividend-adjusted stock return for bank i in quarter t, measured using the closing stock price at the end of the quarter

= (Price$_{it}$ − Price$_{it-1}$ + Dividend$_{it}$)/Price$_{it-1}$

D_{it} = a vector of variables, including dummy variables, that describe changes in laws in period t

M_t = the general stock market return

e_{it} = a disturbance term

and a, b, and c are estimated coefficients.[18]

Econometric Issues

A number of econometric issues arose in deriving a practical estimation relationship from this specification. First, it was anticipated that the effects of changes in the law would be unlikely to be captured by a simple, contemporaneous dummy variable. It is likely that effects of the laws would be anticipated, and that the full expected effects on competition would take time to materialize. Consequently, leads and lags of the explanatory variables, in addition to contemporaneous levels, were employed in the final specification of (1).[19] To economize on model parameters, a third-degree polynomial structure was imposed on the distribution of lead and lag parameters.[20]

Second, the issue arose of whether to use effective dates or passage dates for the law change variables. One might argue that, in a market with rational expectations, the effects of the implementation of a law would be fully capitalized into stock prices when the law is passed, or even prior to that. On the other hand, we have little confidence that we can determine the appropriate "announcement date," given that many analysts and insiders may have reliable information prior to when the law is actually passed. In contrast, the effective date of the law is precisely determined. Given these considerations, we estimated regressions using both the passage date and the effective date. However, we report detailed regression results for the effective date only.

Third, since the data environment is one of a pooled time-series of cross-sections (i.e., banks), the issue of efficiency of the coefficient estimates arises. The direct estimation of (1) on pooled time-series and cross-section data can result in inefficient (but unbiased) parameter estimates unless the coefficient vectors a, b, and c are constant across banks and over time. Unfortunately, the most general techniques for addressing this problem are not employable here because of our sample size, given our need to employ lagged explanatory variables. However, by introducing dummy variables for each time period and bank in equation (1), the importance of the cross-sectional and time-series parameter variation can be explored in a limited way in our sample.[21]

Fourth, it is unlikely that bank stock prices, or stock prices generally, are in equilibrium over time about a constant mean level. Thus, it is likely that the chance of a particular positive or negative deviation in stock prices has varied across our sample time period, which includes several record bull markets. The lack of stationarity can also be a source of inefficiency in parameter estimates. Most economic time series, however, can be made acceptably stationary by first-differencing. This is the rationale in (1) above for studying returns, rather than stock prices, in the model.

Fifth, unbiased estimation of the parameters on the interstate banking law variables, D, requires that the passage of these laws be statistically exogenous to the stock return variable. Similarly, the bank structure variables, S, also must not be endogenous to bank stock returns. In practice, it is unlikely that significant banking legislation or other structural aspects of banking markets are determined completely independently of the characteristics and condition of a region's banks. Thus, there is the potential for self-selection or simultaneous equations bias to be introduced if the law dummies are treated as exogenous.

In the context of this study, however, it is unlikely that this bias is significant since stock prices are likely to have capitalized any cross-sectional variations in legislative control by the banks; legislative changes likely take place in reaction to broader regional economic and banking conditions, and not quarterly variation in stock returns. Thus, in a statistical sense, the effect of legislative changes on stock returns is likely to dominate the reverse effect.

Finally, in a time series setting, the issue of bias in attrition or entry into the dataset must be considered. That is, banks that leave the sample (by failure or merger) or enter the sample (by virtue of being a new bank or by newly offering shares for public trading), may be different from

other banks. In the context of this study, attrition and entry are hypothesized to be an integral part of the process that will affect stock returns' reaction to interstate banking laws. Hence, no control for sample attrition or entry is attempted.

Data Considerations

An extensive database was assembled to test the effect of interstate banking laws on bank returns. Bank stock returns data were obtained from the Compustat data file. This data file contains share price and returns information for about 150 leading U.S. bank holding companies during the period 1964 to 1989.[22]

The resulting data are comprised of the quarterly observations on 174 bank holding companies.[23] Returns are calculated using the closing stock price at the end of the quarter (adjusted for stock splits) and the common dividend paid per share by the ex-dividend date. The CRSP tapes were used as the source for the overall market returns variable used in the empirical work discussed below. The daily returns on the Standard and Poor's Composite Index were converted to quarterly returns by summing the daily returns in each quarter.

Information on interstate banking laws was assembled from numerous sources, including a table from the *Banking Expansion Reporter*, a fact sheet obtained from the American Bankers Association, and Baer and Gregorash (1986). Specifically, data was assembled on features of the various state laws affecting interstate banking, and the dates of passage and the effective dates of these laws. The laws were classified as to their reciprocity conditions (Reciprocal versus Non-reciprocal), and their entry restrictions (Acquisition versus *De Novo*).[24] In addition, the number of potential and actual "source" states was calculated for each state at every point in time. Much of this information is summarized in Chart 1.

Information also was assembled on one aspect of the structural characteristics of banking markets. Specifically, information on intrastate branching restrictions for the year 1983 was obtained from the *Annual Statistical Digest* of the Federal Reserve Board of Governors.[25]

Anticipated Effects

The theoretical and data considerations resulted in an empirical implementation of (1) in the form of an ordinary least squares regression of bank stock returns on the explanatory variables in Table 1.

The emphasis of the estimation of the effects of the laws is on the variable called Change in States.[26] This measures the increase in the number of potential source states that results from the change in the law. (If there is no increase in the number of source states in this quarter over last quarter, this variable is zero.) If the market expects that interstate banking will have the predominant effect of increasing home state bank competition, an increase in Change in States should result in a reduction in returns to bank equity holders, and a negative sign on this variable. (In Table 1, column 3, this is referred to as the Rent Depleting Model, or RDM.)

Alternatively, liberalization could be perceived as working to the advantage of home banks by permitting them (to the extent they activate other states' reciprocal laws) to enter more states, thereby enhancing profits through diversification effects, or perhaps through scale or scope effects. Likewise, because liberalization would broaden the pool of potential acquirers, it might increase the potential diversification, scale, or scope benefits of merging with home banks. Finally, if competition were to decrease, surviving banks would all see increased rents. Whether such benefits would show up in the stock returns of home banks as acquirers, or as acquirees, this Rent Enhancing Model (REM in Table 1) would predict that the coefficient on the Change in States variable would have a positive sign.[27]

Note that the structure of the model implies that a positive change in the number of source states will have a stronger effect, the greater the change. This is consistent with the hypotheses discussed above regarding the sources of interstate banking's potential effects on costs and/or competition.

The two main variations in interstate banking laws are whether the law requires reciprocity and whether the law permits *de novo* entry. The effects of these variations are studied by interacting dummy variables with the Change in States variable.

The coefficient on the variable that interacts Change in States with the Reciprocal Dummy should reveal the extent to which reciprocity requirements influence the effectiveness of the increase in the number of source states.[28] The reciprocity requirement essentially makes the actual number of source states less than the potential number represented by the Change in States variable. To the extent that the main effect of interstate banking is pro-competitive (the Rent Depleting Model), we expect the sign on this interaction term to be positive. From the viewpoint of a home state bank as an acquisition target, however, reciprocity requirements limit the potential benefit to be gained from being acquired and, therefore, may modify any increase in stock price due to the Change in States variable.

For our purposes, the other main distinction among interstate banking laws is whether they permit *de novo* entry.[29] From the standpoint of the Rent Depleting Model, allowing *de novo* entry would be expected to enhance the pro-competitive effect of liberalization by affording an alternative means of entry beyond direct acquisition. A negative sign then would be expected on the interaction of the De Novo Dummy with the Change in States variable.

In practice, however, the *de novo* feature of interstate banking laws is unusual, and in our data set of traded bank stocks, data on the banks of Ohio, New York, and New Jersey dominate the actual instances of affected banks (although more states permit *de novo* entry). Thus, there is some possibility that the De Novo Dummy will simply capture the effects of particular conditions in these states. For example, intrastate bank competition already is very vigorous in these three states, so that allowing interstate entry may have very little procompetitive effect within the home states, but may, through reciprocal provisions, add to the ability of banks domiciled in these states to expand elsewhere, thereby enhancing their potential profitability

and, hence, their expected return. To the extent that this is the case, the interaction of the De Novo Dummy with the Change in States variable would be detecting effects akin to the Rent Enhancing Model, and would be expected to have a positive sign.

We also interact the Change in States variable with a dummy variable indicating whether or not the state has statewide branching.[30] If the state has statewide branching, we can expect the level of competition to be higher than if it has limited branching or unit banking.[31] This would mean that the amount of excess profits that could be competed away with new entry would be less, and, consequently, that any drop in returns would be less. Thus, under the Rent Depleting Model, the interaction of the Statewide Dummy with the Change in States variable would have a positive sign.

Alternatively, under the Rent Enhancing Model, the existence of statewide branching, and, consequently, larger banking organizations pre-interstate banking, may mean fewer benefits to be had from scale or scope effects or diversification effects. Thus, under the Rent Enhancing

Table 1

Explanatory Variables

Variable Name	Description	Expected Effect (RDM = Rent Depleting Model; REM = Rent Enhancing Model)	Form in Regression
Change in States	The change in the number of source states that may enter the original state as the result of the law change.	RDM: Negative REM: Positive	3rd-degree Polynomial Distributed Lag: 3 leads, current, and 3 lags.
Reciprocal Dummy	Equals 1 if the law requires reciprocity and 0 otherwise.	NA	Interacted with other variables.
De Novo Dummy	Equals 1 if entry can be by de novo bank formation, 0 otherwise.	NA	Interacted with other variables.
Statewide Dummy	Equals 1 if statwide branching is permitted in 1983, 0 otherwise.	NA	Interacted with other variables.
State Change X Reciprocal	The Change in States variable multiplied by the Reciprocal Dummy.	RDM: Positive REM: Negative	3rd degree PDL: 3 leads, current, and 3 lags
State Change X De Novo	The Change in States variable multiplied by the De Novo Dummy.	RDM: Negative REM: Positive	3rd degree PDL: 3 leads, current, and 3 lags
State Change X Statewide	The Change in States variable multiplied by the Statewide Dummy.	RDM: Positive REM: Negative	3rd degree PDL: 3 leads, current, and 3 lags
Market Return	The market return, as measured by the Standard and Poor's Composite Index return.	Positive	Entered as a current variable.

Model, the interaction of the Statewide Dummy with the Change in States variable would have a negative sign.

The remaining variable in Table 1 is entered to control for general market conditions which may affect the realized return. The Market Return variable is intended to capture the time serial influence of the general market on bank stock returns. The coefficient on this variable can be interpreted as the "beta" of the bank stocks in our sample. Hence, it is expected that this variable would have a value near positive 1.0.

As shown in Table 1, we do not include the Reciprocal Dummy, the De Novo Dummy, nor the Statewide Dummy in the regression by themselves. Thus, the specification of the regression does not permit these variables to influence the constant term. However, we did estimate a simplified version of the regression with the dummy variables included by themselves, in addition to being included in interaction terms.[32] The results of this regression were consistent in all important respects with those of the main regression that we report below. In general, the coefficients on the dummy variables by themselves were insignificant, and the other coefficients were either insignificant or had the same sign as in the main regression.

IV. Regression Results

The results of the regression described above are reported in Table 2.[33] The coefficients from the full model are presented, along with a Partial Model that employs only the Change in States variable (along with the Market Return variable). The sample mean of the dependent variable is .0357. The regression results reported in Table 2 were obtained using the effective dates of the laws to date changes. The results using the passage dates were similar and will be discussed below.

The results strongly support the notion that the long-run effect of liberalized interstate banking is to enhance banking competition. We turn first to the Partial Model, which contains only the Change in States variable. The coefficients on the various leads and lags suggest that the effect of expansion in the number of source states has little effect on returns three and two periods prior to the implementation date, but, starting in the immediately preceding quarter, significantly depresses the affected banks' stock returns. This finding is consistent with the Rent Depleting Model of the effect of interstate banking.

Summing the coefficients on Change in States over the seven periods in the distributed lag formulation indicates the total effect, over time, of an increase in the number of eligible source states. The sum of these coefficients is strongly significant, and quite large. In effect, at the sample mean, one additional source state reduces affected banks' quarterly stock returns by about 3 percent for each of seven quarters.

The "beta" of stock price returns to the market is very close to one at .99 and is a significant contributor to the variance of bank stock returns.

In the Partial Model, the only parameter describing the law is the Change in States variable. In the Full Model, this variable is interacted with dummies measuring three other variations: reciprocal versus non-reciprocal (the Reciprocal Dummy), the case of allowed *de novo* entry versus prohibited *de novo* entry (the De Novo Dummy), and statewide branching versus restricted branching (the Statewide Dummy).

In the Full Model formulation, the coefficients on the Change in States variable by itself capture the case of a non-reciprocal, non-*de novo* law in a state with restricted branching. Consistent with the Rent Depleting Model, all of these coefficients are negative and significant, and many are strongly significant. Consequently, the sum of the various coefficients is negative and very strongly significant. The evidence suggests that the market reacts quite negatively to an increase in the number of source states.

If the broadening of interstate banking occurs in the context of a reciprocal law, however, the negative effects of an increase in the number of regional source states are not as strong. This is seen in Table 2, where all of the Change in States X Reciprocal coefficients are positive, and all but the third period lag coefficient are significant. The sum also is positive and significant. These results are consistent with the explanation given in the Rent Depleting Model that reciprocity requirements effectively limit potential entry.

The coefficients on the variable interacting Change in States and the De Novo Dummy are positive, yet insignificant, both individually and in their sum. It may be that a *de novo* provision does not significantly influence the effect of interstate banking laws, at least at the effective date. (Below, we will discuss the effect of *de novo* provisions at the passage date for the law.) On the other hand, as discussed above, the banks of only three states dominate the actual instances of banks in our sample in *de novo* states. Therefore, we may not have enough data to accurately isolate the effects of the *de novo* provision from any effects that may be particular to these three states.

Statewide branching appears to mitigate the negative response to an increase in the number of source states. All

of the significant coefficients on the Change in States X Statewide variable are positive, and the sum is positive and significant. These results are consistent with the prediction of the Rent Depleting Model that statewide branching leaves relatively little in the way of excess profits for interstate banking to erode.[34]

Both the Partial Model and the Full Model also were estimated using the dates when the interstate banking laws were passed instead of the dates when the laws went into effect. Throughout the following discussion, the reader should keep in mind that we have relatively little confidence in the accuracy of our passage dates. This does not mean that we do not know the dates when the laws were passed by the state legislatures, but rather, that we do not know the dates when the market began to assimilate the information that interstate banking legislation would be passed.

In most respects, the results obtained using the passage

Table 2

Detailed Regression Results

	Variable	Lead/ Lag	Full Model		Partial Model	
			Coefficient (xE-03)	t-ratio (abs. val.)	Coefficient (xe-03)	t-ratio (abs. val.)
1	Constant	0	18.04	13.58	18.23	13.67
2	Market Return	0	988.39	66.18	993.45	66.45
3	Change in States	+3	−1.27	1.83	.03	.10
4		+2	−2.52	5.19	−.28	1.20
5		+1	−3.50	7.26	−.82	3.49
6		0	−4.26	10.08	−1.39	6.50
7		−1	−4.82	9.61	−1.81	6.83
8		−2	−5.23	10.32	−1.88	7.04
9		−3	−5.52	6.92	−1.42	3.57
10		Sum	−27.11	13.73	−7.56	7.47
11	Change in States X Reciprocal	+3	1.95	2.15		
12		+2	2.63	4.08		
13		+1	3.05	4.79		
14		0	3.15	5.26		
15		−1	2.88	3.78		
16		−2	2.21	2.81		
17		−3	1.08	.85		
18		Sum	16.96	5.92		
19	Change in States X De Novo	+3	.38	.47		
20		+2	.71	1.21		
21		+1	.69	1.19		
22		0	.47	.87		
23		−1	.20	.29		
24		−2	.02	.03		
25		−3	.09	.09		
26		Sum	2.56	1.02		
27	Change in States X Statewide	+3	−.72	.92		
28		+2	−.26	.45		
29		+1	.13	.24		
30		0	.65	1.19		
31		−1	1.48	2.05		
32		−2	2.83	3.76		
33		−3	4.89	4.08		
34		Sum	9.01	3.41		
35	Adjusted R-squared		.32		.31	
36	Number of observations		9706		9706	

dates were consistent with the results obtained with the effective dates. In the Partial Model, all of the significant coefficients on the Change in States variable (the coefficients on the first, second and third period lags) were negative. However, although the sum of the distributed lag coefficients was negative, it was insignificant.

Most important, though, all the Change in States coefficients were negative and significant, as was the sum, in the Full Model with passage dates. In addition, the sum of the coefficients on the Change in States X Reciprocal variable was positive and significant, as before. The sum of the Change in States X De Novo coefficients was positive, as before, but, this time, significant. The sum of the Change in States X Statewide coefficients was positive, as before, but insignificant.

We have found that the market responds, in a qualitatively similar way, to both the passage and the implementation of interstate banking laws. This suggests not only that the passage of such laws constitutes new information, but that their implementation supplies significant *additional* information, information which reinforces the original response. This may be because, when the law is passed, there is considerable uncertainty concerning the environment in which the law will become effective, whereas there is no such uncertainty at the effective date.

In fact, our results suggest that, in some important ways, the response of returns to the laws' implementation is somewhat stronger than their response to the laws' passage, subject to our dating of passage and enactment. For example, in the Partial Model, the sum of the Change in States coefficients is significant when using the effective date but insignificant when using the passage date. In addition, this sum is slightly larger in absolute value and slightly more significant in the Full Model with the effective date (.027, with an absolute t-statistic of 13.73) than in the Full Model with the passage date (.019, with an absolute t-statistic of 12.31). Also, the branching status of the state affects the response at the implementation date, but not the response at the passage date.

Several factors might influence the absolute size and significance of these coefficients. For example, the amount of *new* information that is supplied to the market and the significance of the information for current returns would be important. The significance of a given amount of new information will be less, the more distant in time is any expected change in profits. This is because the present discounted value of a given adjustment in future profits will fall the farther off is the adjustment. This is one possible explanation for the relative size and significance of the coefficients on Change in States in the two versions of the Partial and Full Models.

An alternative explanation may be that we have a more accurate dating for the implementation than for the "passage" of the laws. The inability to pinpoint exactly when new information on interstate banking laws might have first appeared would contribute to the inefficiency of coefficient estimates in the passage date regressions. We have some evidence that this may be the case. We estimated a passage date regression with Change in States interacted with the number of days until implementation of the law included.[35] The capitalized value of future changes should be lower the farther away is implementation, so this interaction term should be positive, given negative coefficients on Change in States. We found that the interaction terms were indeed positive, but insignificant. This lends some support to the notion that we do not have an accurate measure of the passage date.

Despite this concern, the significance of the positive sum of the coefficients on Change in States X De Novo in the passage date estimation of the Full Model deserves some discussion. As mentioned above, it is likely that the states that empirically have incorporated *de novo* features may be those that already are highly competitive. Hence, the effect in those states of expanded interstate banking is more likely to be in the form of diversification advantages to the home state banks as they are now able to enter all of those states whose reciprocal banking laws permit such entry. Apparently this effect shows up at the passage date, and no additional significant effect shows up at the effective date.

V. Conclusion

The empirical work in this paper suggests that interstate banking, particularly when unrestricted by reciprocity requirements, tends significantly to enhance potential and/or actual competition in state banking markets.[36] There is little evidence to support the alternative hypothesis that interstate banking results in significant cost savings due to scale, scope, or diversification effects and/or consolidation that yields less competitive banking conditions. Bank holding company stock returns respond negatively and significantly to an increase in the number of eligible source states from which acquiring bank holding companies can enter. This effect shows up at both the passage date and the effective date of the interstate banking law, suggesting that there is new information that comes to the market once the law is actually implemented. In addition, the negative effects are stronger in the absence of reciprocity requirements and weaker in the presence of a market that is already relatively competitive, as indicated by statewide branching provisions.[37]

Conceivably, of course, the findings in this paper could evolve in the long-run as interstate consolidation proceeds. However, in the time frame of our data, the effects seem to evolve in a direction consistent with more, rather than less, banking competition over time. In addition, although depression of stock returns appears to be the overall effect of increasing the number of source states, there do appear to be conditions under which the returns of individual banks in particular states may benefit from liberalization of interstate banking. Thus, the overall impacts have some state-by-state variations, and stock analysts will have to examine the particular circumstances of further liberalization of state banking laws to discern their effects on individual bank stocks.

Finally, it is important to underscore the limitations of the empirical work presented here. The sample of banks studied here is not necessarily representative of the large number of small banks in the nation. Thus, although it seems that interstate banking increases competition among medium- and large-sized banks, its specific effects on small banks depends upon their competitive relationship with the larger banks in their states. Also, our focus on stock market returns, rather than the actual accounting experience of individual banks, leaves open the possibility that we have captured the market's expectations, but not the reality, about the long-run effects of interstate banking.

NOTES

1. See Trigaux (1990).

2. Maine enacted the first interstate banking law, in 1975. The law did not become effective, though, until 1978. It was a number of years before interstate banking was introduced in any other state; New York was the second, passing a law that became effective in 1982.

3. Oregon is the only state that ever had a regional nonreciprocal interstate banking law. In 1989, a national nonreciprocal law went into effect in Oregon.

4. Some interstate banking laws contain additional provisions such as ceilings on out-of-state control of bank deposits, minimum age requirements for the acquiree, required commitments by the acquirer to community reinvestment, or required capital-to-asset ratios for out-of-state acquirers. Also, some laws prohibit "leapfrogging," the entry by a bank holding company headquartered outside the eligible region, with only a toe-hold subsidiary in a state in the region.

5. As of 1989, Kansas, Montana, and North Dakota had no interstate banking laws, so they are excluded from the chart.

6. In Chart 1, the number of states in the eligible region corresponds to the number of *potential* states, whether or not those states have in fact met the reciprocity requirement.

7. See Zuckerman (1990) for a discussion of Utah's new interstate branching law. Nevada's law is somewhat restrictive in that it allows out-of-state banks to set up *de novo* branches only in counties with a population below 100,000. It is unclear whether the law will be interpreted to allow acquisition or merger with existing branches. (Source: Conversation with the office of the Commissioner, Financial Institutions Division, Nevada Department of Commerce.)

8. Whether a bank would choose to diversify so as to reduce risk would depend on a number of factors, including the risk preferences of shareholders, the risk preferences of bank managers, and the opportunities for shareholders to efficiently diversify their asset portfolios in the securities market. Bank managers' risk preferences are likely to be affected by the nature of bankruptcy costs and the existing system of deposit insurance. (See Boyd and Graham (1986) and Santomero (1984) for further explication of these issues.)

9. For example, regulators impose a barrier to entry by requiring experience in banking as a prerequisite for a new bank charter.

10. See, for example, Keeley and Zimmerman (1985).

11. A market model specifies a particular company's stock returns to be a function of returns on a well-diversified portfolio of stocks and, perhaps, of other factors correlated with aspects of systematic or nondiversifiable risk, such as interest rates. In an "event study," such as that used by Born, Eisenbeis and Harris, the effects of

the events on stock returns are isolated by comparing returns around the time of the event with the returns predicted by the market model. The difference is labelled "abnormal returns" and is attributed to the effect of the event under study.

12. See, for example, Jensen and Ruback (1983). The Born, Eisenbeis and Harris finding also is qualitatively consistent with the finding in de Cossio, Trifts and Scanlon (1987). These authors find that bidding firms in bank acquisitions receive significantly higher abnormal returns when they are involved in intrastate as opposed to interstate mergers, while target firms earn significant abnormal returns from both intrastate and interstate mergers.

13. Similarly, Rose and Wolken (1990) found that, in unit banking and limited branching states, affiliation with a bank holding company generally provides no significant long-term competitive advantage (in terms of market share accumulation) for holding company subsidiaries over independent banks.

14. Liang and Rhoades calculate the probability of bank insolvency to be a function of the expected net-income-to-asset ratio, the capital-to-asset ratio, and the standard deviation of net income-to-assets.

15. The "premium" in a merger is the difference between the price per share of stock paid by the acquirer and the price per share just prior to the time that the possibility of a merger first became known to the public. In some cases, the premium is fully capitalized in the market price of the stock, and the acquirer pays a price per share corresponding to the market price. In other cases, the acquirer ends up paying more than the prevailing market price per share. Adkisson and Fraser proxy the base market value of the firm with the book value of the firm, and measure the premium as the ratio of the purchase price to the book value.

16. Despite the evidence cited suggesting the relative unimportance of economies of scale and scope, one might still reasonably maintain that such effects are indeed important. There are two potentially mitigating factors that bank cost studies may not adequately take into account. First, the FDIC's "too big to fail" policy undoubtedly favors large banks over small ones, and this may have the effect of decreasing large banks' cost of funds. Second, banks with large branch networks may be preferable, for reasons of convenience, from the bank customer's point of view. This may be true even though, for a given level of services, such banks may produce services no more efficiently than small banks.

17. As of December 31, 1985, there were 15,072 commercial banks in the United States. (Source: *Annual Statistical Digest.*)

18. A previous researcher, Chong (1989), has studied the effects of the passage of interstate banking laws on bank holding company stock returns. He estimated a two-factor market model, regressing individual daily bank

stock returns on a constant term, the market return, the twist of the yield curve, and interstate banking law announcement date dummies, interacted with all the other independent variables. Chong's inclusion of the market return and yield curve interaction terms in his regression seems somewhat arbitrary. It is unclear why, in theory, interstate banking would affect a bank's exposure to systematic risk at all. Chong finds that interstate banking increases banks' profitability and their exposure to market risk, but not interest rate risk.

Our model differs from Chong's in three respects. First, we look for effects in quarterly stock returns, not daily returns. A day seems too short a time frame in which to detect the effects of changes in laws. Second, we look at the response of returns around the date when the law goes into effect, as well as around the date when it is passed. Third, our specification differs in that we do not allow interstate banking to affect exposure to systematic risk, but we do, unlike Chong, allow different types of laws to have different effects. In addition, we allow the laws to have different effects in different environments. Because our model is significantly different from Chong's model, we do not expect that our results should accord with his.

19. We employed three leads, a contemporaneous term, and three lags in the specification of the model. Since our observations are quarterly, this structure allows for a relatively long period over which interstate banking law changes can affect bank stock returns. Such a large window is unusual in a traditional "event study." However, such studies usually examine the effects of events, such as merger announcements, that are hypothesized to have relatively certain consequences at certain times for certain banks. In contrast, our study examines the effect of an event whose effects, even in theory, are not as well-defined in these respects. Therefore, it seems to us reasonable to assume, a priori, that the effects will be spread out over a relatively long period of time.

20. The estimation of a polynomial distributed lag (PDL) formulation spares degrees of freedom by introducing a specific structure to the various lag coefficients. For example, using a third-degree PDL to estimate the coefficients in a ten-lag model reduces the number of estimated parameters from ten to four. The ten coefficients, w_0, w_1, . . . , w_9 are replaced by the formula

$$w_i = c_0 + c_1 i + c_2 i^2 + c_3 i^3 \quad i = 0, 1, 2, \ldots 9$$

where the cs are the four parameters of the polynomial to be estimated.

21. One technique is to introduce dummy variables for every cross-sectional observation and time period. Entered in the regression by themselves, they permit the intercept term, a, to vary across banks and over time. Additionally, cross-sectional dummies can be interacted with the explanatory variables, permitting the slope coefficients, b, c, and d, to vary cross-sectionally. We were able to examine time variation in the intercept, but, due to software limitations, we were not able to examine any variation in the slopes.

Alternatively, an error-components model can be esti-

mated directly, permitting the error term e_{it} to be decomposed into cross-section specific, time-series specific, and mixed effects. This technique involves a generalized least squares estimation technique that is foreclosed by computation limitations and the necessity to include lagged explanatory variables.

22. The criteria for inclusion in the Compustat bank file are that the company's stock be actively traded and that the company has high investor interest. Deletions are effected upon mergers, suspensions from trading, and bankruptcy filings.

23. We have bank holding companies in 44 different states in our sample. Our sample does not contain any bank holding companies located in Montana, North Dakota, South Dakota, Maine, New Hampshire, Vermont or Kansas, but does contain at least one bank holding company located in Washington, D.C., which is treated as a separate "state."

24. We also classified the laws according to their geographic focus (Regional versus National). However, the effect of this distinction proved to be statistically insignificant, so we omit it from the reported regression results. Because we also included the change in the number of eligible source states as an explanatory variable in the regression, it is not surprising that the national versus regional distinction was insignificant.

25. In 1983, 19 of the 44 states represented in our sample had statewide branching.

26. There are 186 observations in our sample with non-zero values of Change in States.

27. It may be argued that, just as anticipated diversification benefits may cause an increase in the stock price of potential acquirers and/or acquirees, so may anticipated competitive benefits. The anticipated increase in profits due to entry into markets where competition had been lying dormant may increase the stock price of potential merger participants. However, we expect that the negative effects felt by those banks facing increased competition but not anticipated to be involved in mergers would outweigh any positive effects felt by potential merger candidates. On the other hand, we do not expect anticipated diversification to have any effect, by itself, on those banks that are not judged by the market to be potential merger candidates. Therefore, for the market as a whole, diversification should increase stock prices.

28. There are 174 observations in our sample with non-zero values of Change in States X Reciprocal.

29. There are 51 observations in our sample with non-zero values of Change in States X De Novo.

30. There are 76 observations in our sample with non-zero values of Change in States X Statewide.

31. Studies have shown that barriers to entry in the form of branching restrictions decrease competition in local banking markets. For a review of these types of studies, see McCall (1980).

32. As in the main regression, three leads, a contemporaneous term, and three lags were included.

33. The number of observations is the original number of observations in the sample, 10,868, minus any observations deleted owing to the lag structure of the model.

34. To test further the hypothesis that a relatively competitive banking market sees less of a negative impact from interstate banking, we also estimated the full model with a four-firm concentration ratio variable added. Like the dummy variables, this variable entered in interaction terms with the Change in States variables. The estimated coefficients on these interaction terms were insignificant, and the signs and significance of the other coefficients were unaffected.

The concentration ratio does not perform as well as the statewide branching variable. This may be because, even though, on a statewide basis, markets in restricted branching states are not highly concentrated, local market power may be substantial.

35. Both these regressions and the original Full Model regression with passage dates were complicated by the existence of legislation which specifies a regional law with a national trigger date. In such instances, both future changes were passed on the same date. Thus, there are two potential values for Change in States when using the passage date: the number of states that is to be included in the region, and the number of states that is to be added at the time when national interstate banking goes into effect.

In the original Full Model, we chose 50 for Change in States in instances when a regional law with a national trigger date was passed. In the model including the interaction terms involving the number of dates from passage to implementation, we defined two Change in States variables, as described above.

36. In a study of the effect of competition on bank charter values and risk-taking, Keeley (1990) found that liberalized interstate banking does not affect the level of competition. We do not believe that his result is directly comparable to our result, since he does not allow for different effects depending upon the type of law and the number of states that can enter.

37. In a recent paper, Black, Fields and Schweitzer (BFS) (1990) find results that are not entirely consistent with ours. They find that the passage of interstate banking laws increased the stock returns of regional banking organizations and decreased the stock returns of money center banks.

The authors attribute their results to the differential treatment of source states with and without money center banks. Initially, many interstate banking laws prohibited entry from states in which money center banks are headquartered. This means that, all other things equal, money center banks faced fewer instances in which their own states' passage of legislation enabled them, through reciprocity agreements, to enter other states. Thus, the authors seem to argue, the main effect of interstate banking legislation in states with money center banks is to lower stock returns through an increase in potential competition. In regional bank states, they seem to suggest, this negative rent depleting effect is more than offset by the positive effect of an increase in the number of target states (through reciprocity agreements).

We estimated regressions that controlled for bank size, and we did not find this to be a significant determinant of the qualitative effect of interstate banking legislation. Because money center and regional banks can likely be effectively distinguished by size, our results likely disagree with the BFS results; we seem to find a negative effect on stock returns for both money center and regional banks.

At least two explanations can be given for the difference in results. First, our evidence shows that it is important to look at both the passage and the effective dates, and to look at a relatively large window on either side of the event dates. (The BFS study uses a window beginning 30 days prior to passage and ending 30 days after passage.) Indeed, we too find positive (but individually insignificant) coefficients for the third, second, and first period leads in our Partial Model with passage dates, but the *sum* of lead, contemporaneous and lag coefficients is negative.

Second, the BFS control variable is based on bank stock returns in states that did not concurrently pass their own legislation. It is unclear to what degree the passage dates in the BFS data set coincide. If there is significant coincidence, the BFS methodology presents a potentially serious endogeneity problem. This is because the timing of interstate banking legislation in various states may be dependent on factors such as the condition of banks and the competitive environment in those states. These factors may also independently influence differences between bank stock returns, thereby biasing regression results.

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